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**EUROPEAN PATENT APPLICATION**

(21) Application number: 84303490.1

(51) Int. Cl.<sup>4</sup>: **A 61 M 15/00**

(22) Date of filing: 23.05.84

(30) Priority: 24.05.83 GB 8314308

(43) Date of publication of application:  
02.01.85 Bulletin 85/1

(84) Designated Contracting States:  
AT BE CH DE FR GB IT LI LU NL SE

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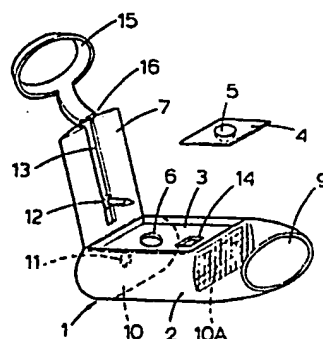
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(54) Inhalation device.

(57) A medical administration device comprises a body (1) with a chamber (2) which is arranged to receive a blister pack (4) with a container (5) for medicament. The chamber is normally closed by a cover (7) which may be opened to permit a container to be inserted and located in the chamber. A mouthpiece (9) communicates with the chamber and a patient may inhale through it. The chamber has an air inlet (11). A spike (12) is engageable with a container in the chamber when the cover is closed to open a container located in the chamber so as to permit medicament to be withdrawn from the container when the patient inhales.



**Fig.1**

TITLE MODIFIED  
see front page

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Title: Medical Administration Devices

This invention relates to medical administration devices, particularly devices by which a medicament can be administered to patients inhaling through the devices. Devices used for administering medicaments by inhalation are now well known for administering medicaments to patients suffering from bronchial conditions such as, for example, bronchial asthma. In such known devices, medicament in powder or other finely divided form is supplied in capsules which are loaded by a patient into the inhalation device. The medicament is then released from the capsule and inhaled by the patient usually through the mouth, but sometimes through the nose. The devices may also be used to dispense medicaments other than by inhalation, in tablet, powder or liquid form.

An object of the present invention is to provide a more convenient way of administering medicaments to such patients. The device of the present invention makes use of the technique of packing medicaments by encapsulating them in a container or sachet or, for example, so-called blister packs, that is to say packs comprising a sheet of material which acts as a carrier and which is provided with a number of breakable or openable containers called "blisters" incorporating a sheet secured on a first sheet to form a cover or lid. Such blister packs are in common use with tablets of one kind or another. The present invention provides a way of administering medicaments not only in tablet form but also in finely divided form or in liquid form.

According to the present invention, a medical administration device comprises a body with a chamber therein, the said chamber being adapted to receive a

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container for medicament; a cover which normally closes the chamber but which may be opened to permit a container to be inserted and located in the chamber; a mouthpiece communicating with the chamber and through which a patient  
5 may inhale; at least one air inlet leading into the chamber; and means engageable with a container in the chamber when the cover is closed to open a container located in the chamber so as to permit medicament to be withdrawn from the container when the patient inhales.  
10 The mouthpiece is preferably arranged to be received by the mouth, but can, if desired, be arranged to enter a nostril of the patient to dispense suitable medicaments.

Some embodiments of the invention are illustrated in the accompanying schematic drawings in which:

15 Figure 1 is a perspective view of a single dose medical inhalation device according to this invention;

Figure 2 is a perspective view of an opening spike forming part of the device;

20 Figure 3 is a perspective view of a multidose inhaler;

Figure 4 is a detailed view of part of the device;

Figure 5 is a detailed perspective view of another part of the device;

25 Figure 6 is a perspective view of an alternative construction, and

Figures 7 and 8 are perspective views of another alternative construction.

In the embodiment of the invention illustrated in Figures 1 and 2, a medical inhalation device comprises  
30 an elongated body 1 of plastics material. This body contains a chamber 2 with an intermediate partition or support 3 arranged to support a blister pack 4 provided with a single container 5 for medicament in solid finely divided form. The support 3 has a location hole 6 in

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which the blister 5 of the blister pack can be located. Alternatively, the hole 6 can be arranged to receive another kind of openable container such as a capsule.

The body has a lid or cover 7 which may be formed  
5 as an integral part of the moulding of the device. The lid or cover 7 being connected with the body 1 by an integral plastics hinge 8 which may be a hinge of the kind commonly known as a living or natural hinge. The body has a mouthpiece 9, the mouthpiece end of the  
10 device being herein considered to be the front end. The body has an air inlet 11 which may be in the rear wall 10 and through which air can enter the chamber 2. The front wall 10A of the chamber 2 is in the form of a grid. Inside the cover or lid 7 is an opening spike  
15 12 illustrated in detail in Figure 2. The spike 12 is arranged so that when it is registered with the location hole 6 and the lid 7 is closed the spike will pierce the blister 5 of the blister pack and enable the medicament in the blister pack to enter the chamber 2.  
20 The inside of the lid is provided with a track 13 in which the spike 12 can slide. When the device is not in use the spike 12 can be positioned in its track 13 so that when the lid is closed the spike will enter a rest or dwell hole 14 in the partition or support 3.  
25 Any suitable means such as grooves (not shown) may be provided for locating the spike in either of these positions.

In use, therefore, the device may be pre-loaded with a blister pack 4 and carried by the patient with the  
30 spike 12 located in the hole 14 until he needs to inhale medicament. When he needs to inhale medicament, the patient opens the lid 7 and moves the spike 12 into a position such that when the lid is again closed it will pierce the container 5 of the blister pack. When the  
35 patient then inhales through the mouthpiece 9 the powder

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will be withdrawn from the container 5 and the chamber 2 into the patient. The lid is provided with a cap 15 connected to the lid by an integral plastics hinge 16. When the lid is closed the cap 15 may be arranged to fit  
5 over the mouthpiece 9.

The arrangements illustrated in Figures 3 to 6 inclusive are of generally similar construction but are arranged to provide a multidose device. In the arrangement illustrated in Figure 3 an elongated body 16 is  
10 provided with feet 17 to prevent the device from rolling when it is placed on a flat surface. The body 1 includes a chamber 18 with a partition or support 19 for a blister pack 20 having a plurality of containers or blisters 21 for medicament. The partition or support 19 is provided  
15 with a plurality of location holes 22 arranged in two rows to correspond with the two rows of blisters 21 in the blister packs 20. The partition 19 also has a hole 23 which is a rest or dwell hole for a spike 24 movable in a track 25 inside a lid 26 which is an integral part  
20 of the moulding forming the device and which is connected to the body by an integral plastics hinge 27. A plurality of grooves 29 or other location means are provided (only two of which are shown in Figure 3) for locating the spike in register with one of the holes 22 or 23. . The  
25 body is provided with a mouthpiece 28 at its front end. The rear end of the device is provided with a back panel 30 illustrated in Figure 5, this back panel being provided with air inlet holes 31. A baffle plate 32 forms part of the panel 30. A cap 33 for the mouthpiece is  
30 connected to the lid 26. In use, a blister pack 20 is loaded into the chamber 18 above the partition or support 19 with the blisters 21 located in the various holes 22. When a patient desires to inhale, the lid is opened and the spike 24 is arranged in a position at

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which it will when the lid is re-closed register with the appropriate blister 21 and pierce that blister. For convenience of use, the various location holes in the partition 19 may be numbered and similar numbers may be provided adjacent the track 25 to enable the spike to be easily located in the desired position. The spike may have grooved or fluted walls, the grooves or flutes 34 (Figure 4) permitting air to enter when the lid is closed. When the lid is closed the spike 24 will pierce through a blister as clearly shown in Figure 4.

When a blister has been pierced the patient may inhale through the mouthpiece and in so doing powder will be entrained in the air being inhaled and will be withdrawn through the mouthpiece.

If desired, there may be only a single row of blisters 21 in the blister pack.

Figure 6 illustrates an alternative in which the hinge 27 is provided at the side of the body 1 instead of at an end.

Another modified device is illustrated in Figure 7.

This modification is intended for use with single blister packs 28 each containing one dose of medicament. The device illustrated comprises a body with a mouthpiece portion 35 at one end which is considered to be the front end of the device. A grid 36 is provided at the rear end of the mouthpiece portion. Behind the grid 36 is a chamber 37 with a top 38 having a central aperture. The top 38 supports a blister pack 28.

Behind the chamber 37 is a magazine 39 for spare or unused blister packs 28 such magazine grooves being open at the top and are adapted to contain one or more blister packs 28. An upwardly projecting wall 40 is provided between the magazine and the blister chamber 37.

A lid 41 is hinged at the rear end of the body. When closed, the lid 41 embraces all but the mouthpiece

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portion of the body and closes the blister chamber 37 and the magazine 39.

5 A forward portion of the lid 41 has a spike 42, supported by a flexible trigger plate 43. This spike may be provided with air inlet passages similar to those described with reference to Figure 4 of the drawings. If a blister pack 28 is loaded on the support partition 38 the lid is closed and the trigger plate 43 is depressed. The spike 42 will enter the chamber 37 through a hole 44  
10 and pierce through the blister. The patient may then withdraw medicament from the blister into his mouth by inhaling through the mouthpiece.

If desired a removable cover 31 may be fitted on the mouthpiece 35.

15 The blisters are preferably arranged to contain medicament in solid divided form but they can be arranged to contain a tablet or a liquid.

## CLAIMS:

1. A medical administration device comprising a body with a chamber therein, the said chamber being adapted to receive a container for medicament; a cover which normally closes the chamber but which may be opened to permit a container to be inserted and located in the chamber, a mouthpiece communicating with the chamber and through which a patient may inhale; at least one air inlet leading into the chamber; and means engageable with a container in the chamber when the cover is closed to open a container located in the chamber so as to permit medicament to be withdrawn from the container when the patient inhales.
2. A device as claimed in claim 1, wherein the chamber has a partition on which a pack provided with a container may be supported, the partition having a locating aperture extending through it so that the container may be located therein; the cover is hingedly connected with the body; and an opener spike carried by the hinged cover and so positioned that when the cover is closed the spike will pass through the aperture in the partition thereby to open a container located therein.
3. A device as claimed in claim 2, wherein the opener spike is slidable in a track on the inside of the cover so that the position of the spike may be adjusted; and the partition has a dwell aperture in which the spike may dwell when the cover is closed without opening a container located in the first aperture.



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4. A device as claimed in claim 2 or claim 3, wherein the cover is arranged when closed to lie adjacent one side of the partition; the mouthpiece is located at a front end of the body; an air inlet leading into the chamber on the other side of the partition.
5. A device as claimed in claim 2, wherein the partition is adapted to support a pack provided with a plurality of containers for medicament and has a plurality of locating apertures each of which is arranged to receive one of the containers, the spike being movable in a track inside the cover so that its position may be adjusted to register with that of any one of the locating apertures or with that of a dwell aperture in the partition in which the spike may dwell without opening a container.
6. A device as claimed in any one of the preceding claims wherein the cover is connected with a captive cap adapted to close the mouthpiece.
7. A device as claimed in any one of claims 2 to 5, wherein the mouthpiece is located at the front of the body, an air inlet leads into the chamber and wherein a baffle plate is supported by the rear wall of the body and is located inside the chamber.
8. A device as claimed in either of claims 1 or 2, wherein the mouthpiece is located at the front end of the body; the partition has a single locating aperture; and a magazine adapted to contain a plurality of packs is arranged to the rear of the chamber.

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9. A device as claimed in any one of claims 2, 3, 5 or 8 wherein air inlets to the chamber extend through the spike.

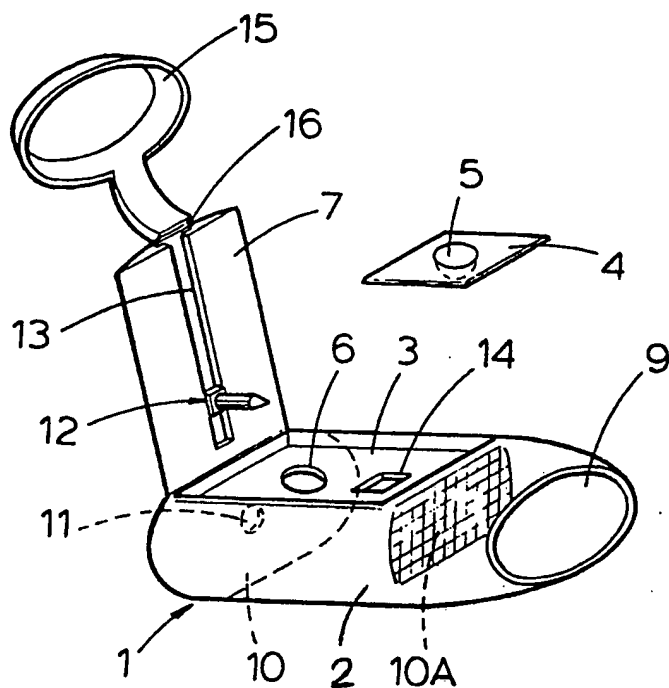


Fig. 1

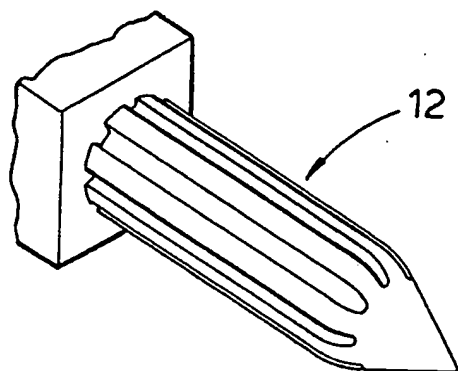


Fig. 2

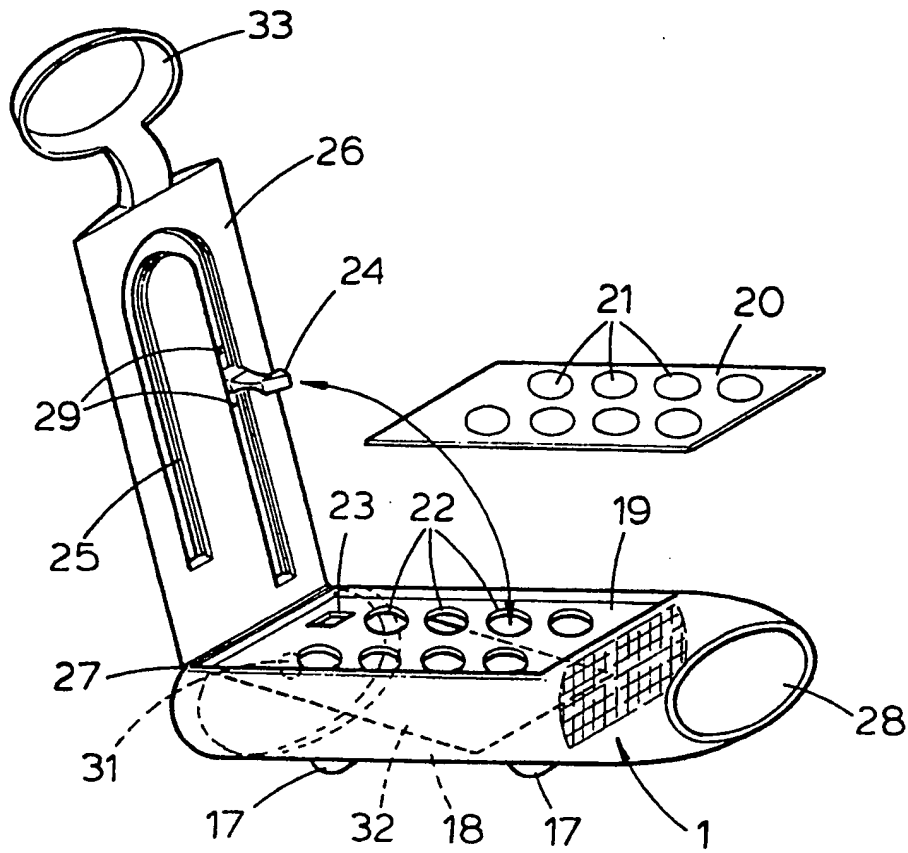


Fig. 3

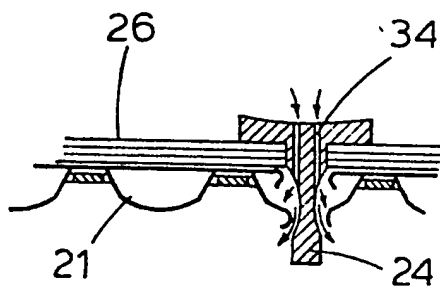


Fig. 4

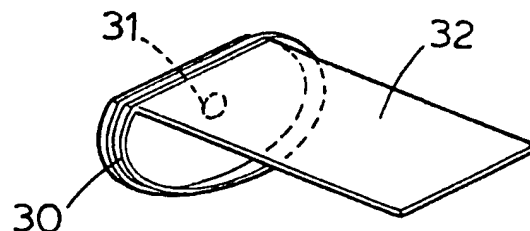


Fig. 5

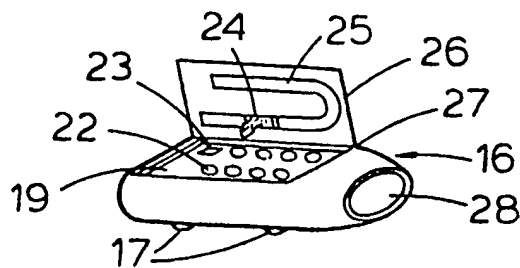


Fig. 6

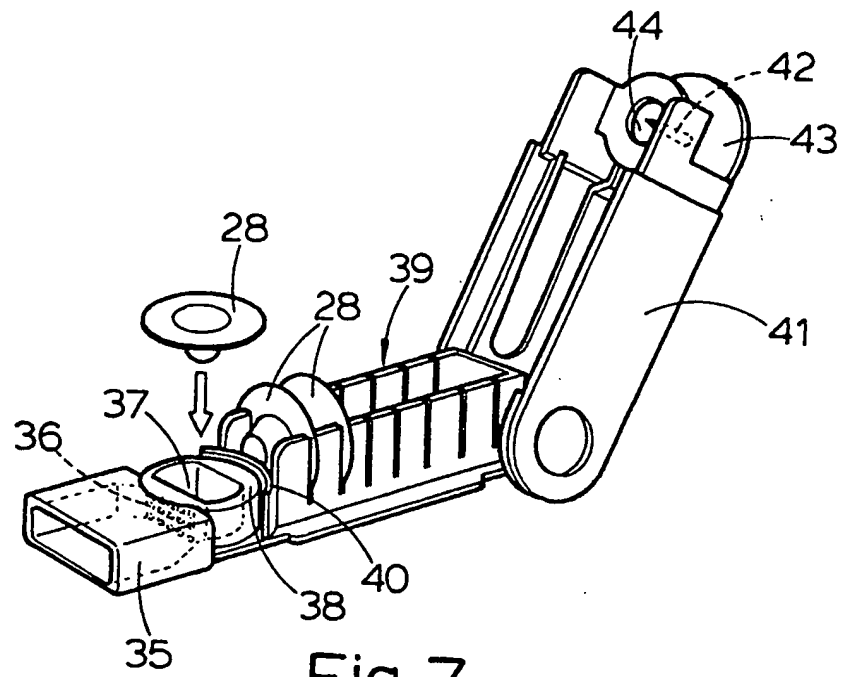


Fig. 7

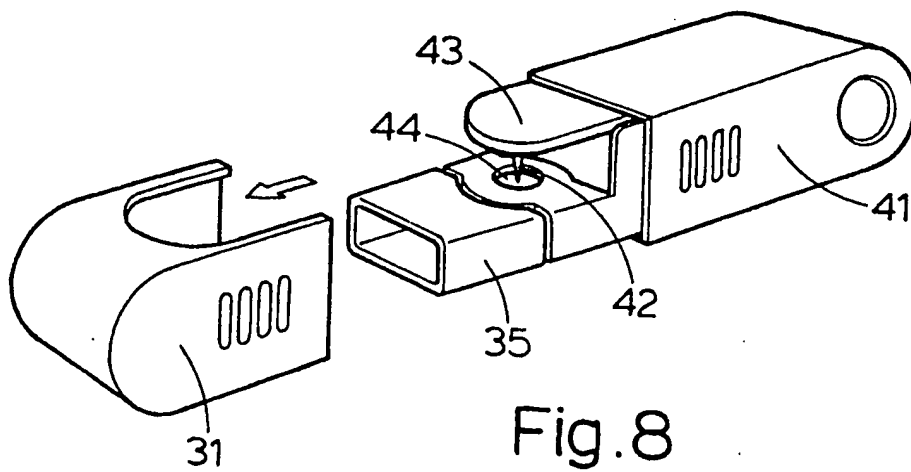


Fig. 8



European Patent  
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# EUROPEAN SEARCH REPORT

**0129985**  
Application number

EP 84 30 3490

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	EP-A-0 041 783 (FISONS LTD.) * Claims 1, 9; figure 6 *	1,4	A 61 M 15/00
A	DE-A-2 654 018 (AB DRACO) * Claims 1-4; figure *	1,8	
A	DE-A-3 016 127 (SIGMA TAU) * Figures 1-3 *	1	
A	US-A-3 425 414 (LA ROCHE) * Claim 1; figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			A 61 M 15/00
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 20-08-1984	Examiner BARNY DE ROMANET P.M
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	